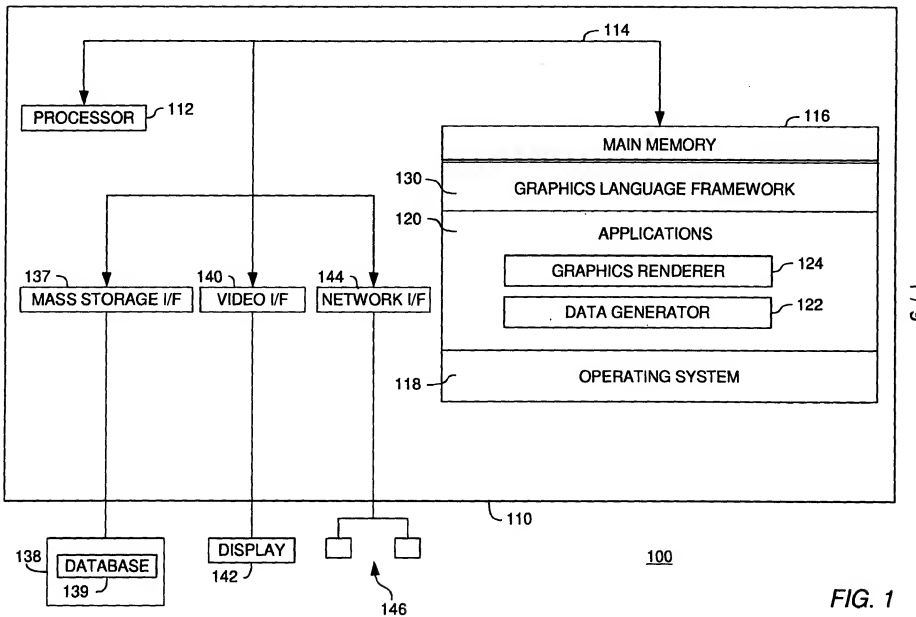
114
PROCESSOR
112
116
MAIN MEMORY
130
GRAPHICS LANGUAGE FRAMEWORK
120
APPLICATIONS
GRAPHICS RENDERER
124
DATA GENERATOR
122
137
MASS STORAGE I/F
140
VIDEO I/F
144
NETWORK I/F
118
OPERATING SYSTEM
110
138
DATABASE
139
DISPLAY
142
146
100

FIG. 1

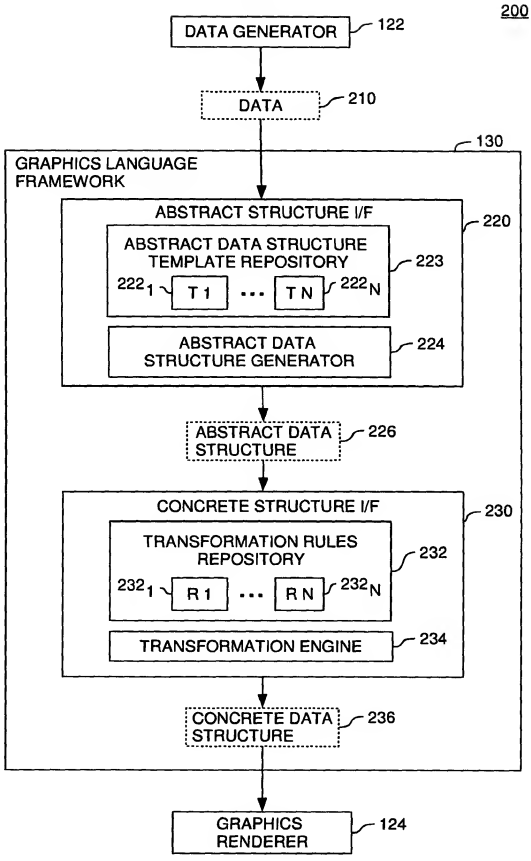
200
DATA GENERATOR
122
DATA
210
130
GRAPHICS LANGUAGE FRAMEWORK
ABSTRACT STRUCTURE I/F
220
ABSTRACT DATA STRUCTURE TEMPLATE REPOSITORY
223
222 1
T 1
T N
222 N
ABSTRACT DATA STRUCTURE GENERATOR
224
ABSTRACT DATA STRUCTURE
226
CONCRETE STRUCTURE I/F
230
TRANSFORMATION RULES REPOSITORY
232
232 1
R 1
R N
232 N
TRANSFORMATION ENGINE
234
CONCRETE DATA STRUCTURE
236
GRAPHICS RENDERER
124

FIG. 2

300
LOGICAL / ABSTRACT REPRESENTATION
PHYSICAL / CONCRETE REPRESENTATION
ABSTRACT DATA STRUCTURE
226
TRANSFORMATION RULES
310
TRANSFORMATION RULES REPOSITORY
232
TRANS-FORMATION PROCESS
SVG
OTHER GRAPHICS RENDERING LANGUAGE
<svg
xmlns="http://www.svg.org">
<g transform="translate(100,100)">
<rect x="0" y="0" width="100"
height="100" fill="white"/>
<text x="25" y="50">
translate XML to SVG
</text>
. . .
CONCRETE SVG DATA STRUCTURE
314 1
OTHER CONCRETE DATA STRUCTURE
314 N

FIG. 3

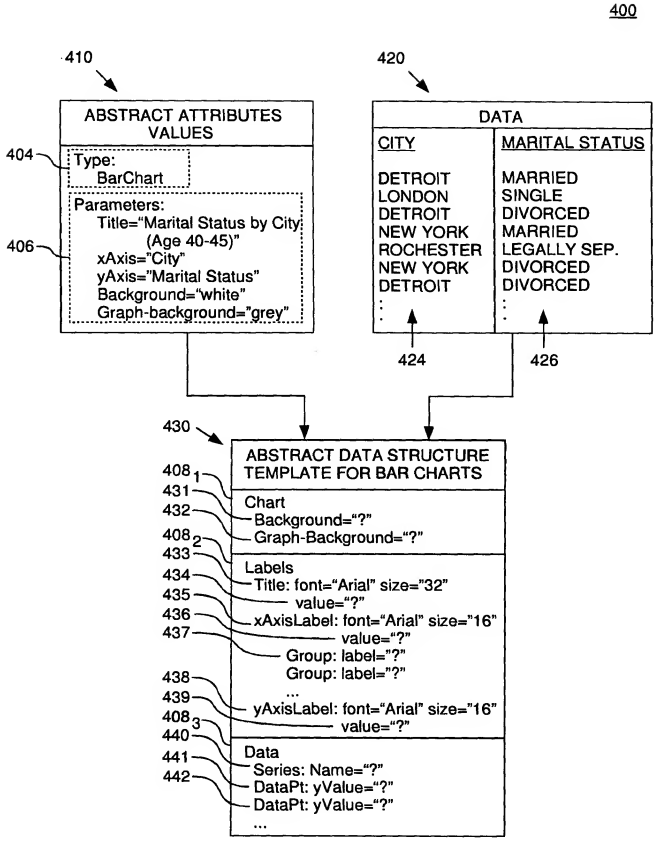
400
410
420
ABSTRACT ATTRIBUTES VALUES
404
Type:
BarChart
406
Parameters:
Title="Marital Status by City (Age 40-45)"
xAxis="City"
yAxis="Marital Status"
Background="white"
Graph-background="grey"
DATA
CITY
MARITAL STATUS
DETROIT
LONDON
DETROIT
NEW YORK
ROCHESTER
NEW YORK
DETROIT
MARRIED
SINGLE
DIVORCED
MARRIED
LEGALLY SEP.
DIVORCED
DIVORCED
424
426
430
ABSTRACT DATA STRUCTURE TEMPLATE FOR BAR CHARTS
408 1
431
Chart
432
Background="?"
Graph-Background="?"
408 2
433
Labels
434
Title: font="Arial" size="32"
435
value="?"
436
xAxisLabel: font="Arial" size="16"
437
value="?"
Group: label="?"
Group: label="?"
...
438
439
yAxisLabel: font="Arial" size="16"
value="?"
408 3
440
Data
441
Series: Name="?"
442
DataPt: yValue="?"
DataPt: yValue="?"
...

FIG. 4A

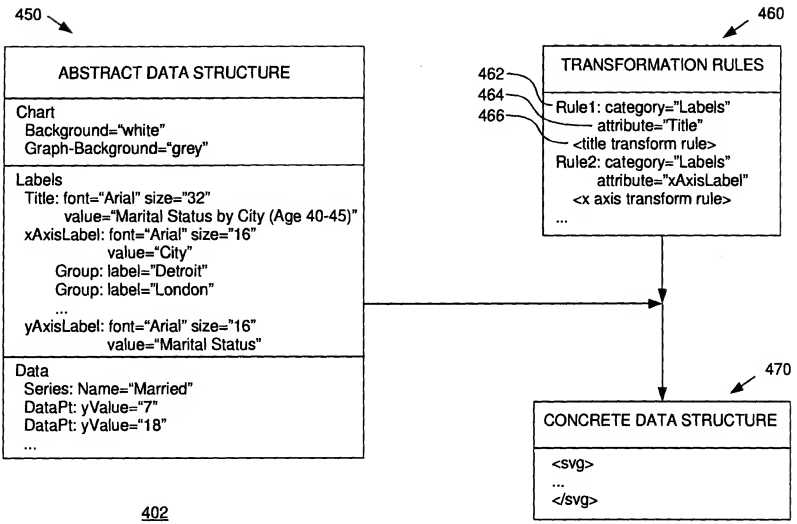
450
ABSTRACT DATA STRUCTURE
Chart
Background="white"
Graph-Background="grey"
Labels
Title: font="Arial" size="32"
value="Marital Status by City (Age 40-45)"
xAxisLabel: font="Arial" size="16"
value="City"
Group: label="Detroit"
Group: label="London"
...
yAxisLabel: font="Arial" size="16"
value="Marital Status"
Data
Series: Name="Married"
DataPt: yValue="7"
DataPt: yValue="18"
...
402
460
TRANSFORMATION RULES
462
464
466
Rule1: category="Labels"
attribute="Title"
<title transform rule>
Rule2: category="Labels"
attribute="xAxisLabel"
<x axis transform rule>
...
470
CONCRETE DATA STRUCTURE
<svg>
...
</svg>

FIG. 4B

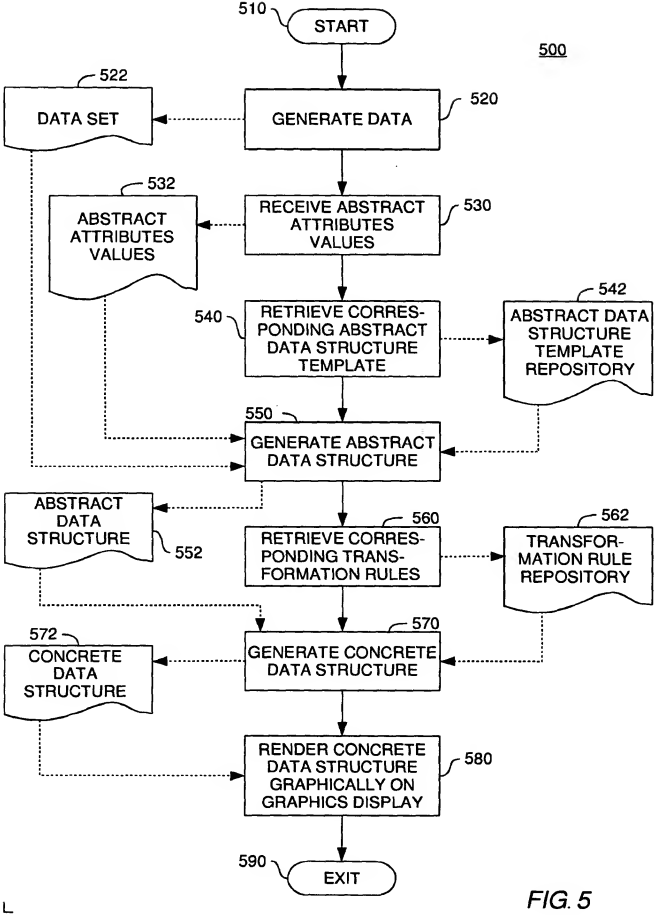
510
START
500
522
DATA SET
GENERATE DATA
520
532
ABSTRACT ATTRIBUTES VALUES
RECEIVE ABSTRACT ATTRIBUTES VALUES
530
542
540
RETRIEVE CORRESPONDING ABSTRACT DATA STRUCTURE TEMPLATE
ABSTRACT DATA STRUCTURE TEMPLATE REPOSITORY
550
GENERATE ABSTRACT DATA STRUCTURE
ABSTRACT DATA STRUCTURE
552
560
562
RETRIEVE CORRESPONDING TRANSFORMATION RULES
TRANSFORMATION RULE REPOSITORY
572
570
CONCRETE DATA STRUCTURE
GENERATE CONCRETE DATA STRUCTURE
RENDER CONCRETE DATA STRUCTURE GRAPHICALLY ON GRAPHICS DISPLAY
580
590
EXIT

FIG. 5

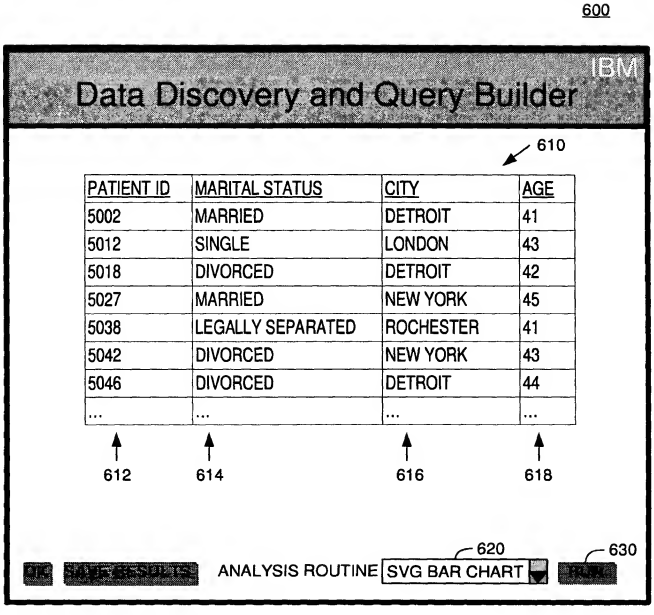
600
IBM
Data Discovery and Query Builder
610
PATIENT ID
MARITAL STATUS
CITY
AGE
5002
MARRIED
DETROIT
41
5012
SINGLE
LONDON
43
5018
DIVORCED
DETROIT
42
5027
MARRIED
NEW YORK
45
5038
LEGALLY SEPARATED
ROCHESTER
41
5042
DIVORCED
NEW YORK
43
5046
DIVORCED
DETROIT
44
...
...
...
...
612
614
616
618
620
630
ANALYSIS ROUTINE
SVG BAR CHART

FIG. 6

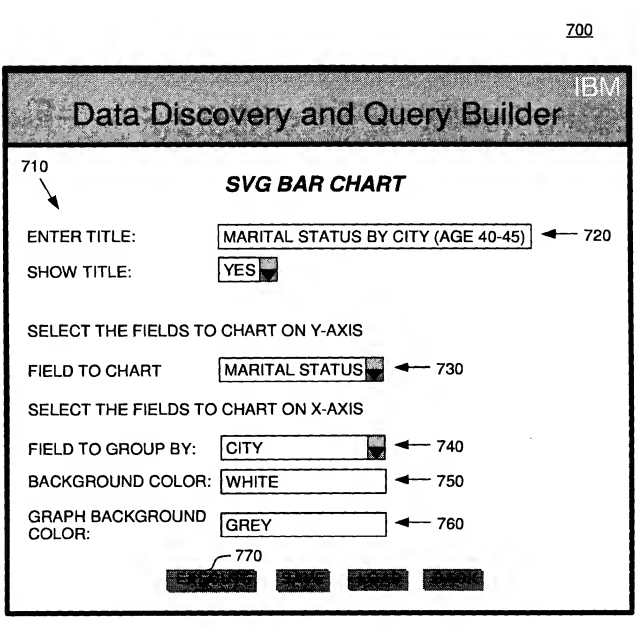
700
IBM
Data Discovery and Query Builder
710
SVG BAR CHART
ENTER TITLE:
MARITAL STATUS BY CITY (AGE 40-45)
720
SHOW TITLE:
YES
SELECT THE FIELDS TO CHART ON Y-AXIS
FIELD TO CHART
MARITAL STATUS
730
SELECT THE FIELDS TO CHART ON X-AXIS
FIELD TO GROUP BY:
CITY
740
BACKGROUND COLOR:
WHITE
750
GRAPH BACKGROUND COLOR:
GREY
760
770

FIG. 7

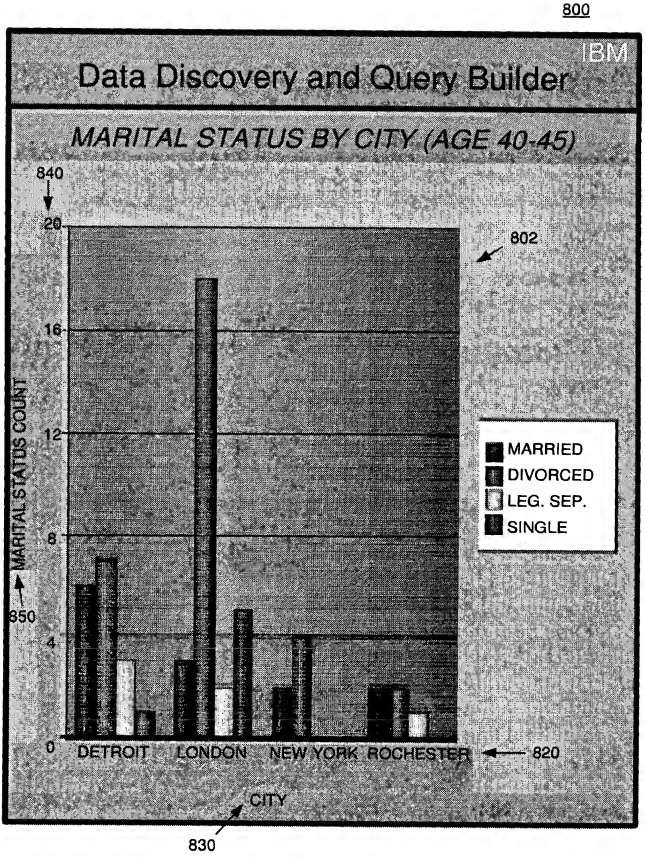
800
IBM
Data Discovery and Query Builder
MARITAL STATUS BY CITY (AGE 40-45)
840
20
16
12
8
4
0
MARITAL STATUS COUNT
850
802
MARRIED
DIVORCED
LEG. SEP.
SINGLE
DETROIT
LONDON
NEW YORK
ROCHESTER
820
CITY
830

FIG. 8